mixed oxide tunnel barrier. Effects of these major compositional changes differ from those involving small departures from exact oxide stoichiometry that have been used in some of the previous disclosures referenced above. Such non-stoichiometric effects may also be present but will not be mentioned further in the following discussions which describe broad classes of approaches for forming a very broad range of asymmetrical barriers due to grading mixed oxide compositions.

As a starting point for forming a graded, mixed oxide barrier, we begin by noting that barriers for a range of metal oxides vary widely, from ~0.2 to 2.7 eV, depending on the contact metallurgy. (See ~~Figure~~ Table A).

TABLE A

	E_G	ϵ_r	$\epsilon\infty$	χ	Φ_o(Pt)	Φ_o(Al)
Conventional Insulators						
SiO_2	~ 8eV	4	2.25	0.9 eV		3.2 eV
Si_3N_4	~ 5 eV	7.5	3.8			2.4 eV
Metal Oxides						
Al_2O_3	7.6 eV	9 - 11	3.4			~ 2 eV
NiO						
Transition Metal Oxides						
Ta_2O_5	4.65 – 4.85		4.8	3.3	2.0	0.8 eV
TiO_2	6.8	30-80	7.8	3.9	~ 1.2 eV	
ZrO_2	5 – 7.8	18.5-25	4.8	2.5		1.4
Nb_2O_5	3.1	35-50				
Y_2O_3	6		4.4			2.3
Gd_2O_3						
Perovskite Oxides						
$SrBi_2Ta_2O_3$	4.1		5.3	3.3	2.0	0.8 eV
$SrTiO_3$	3.3		6.1	3.9	1.4	0.2 eV
$PbTiO_3$	3.4		6.25	3.5	1.8	0.6 eV
$PbZrO_3$	3.7		4.8		~ 1.4	0.2 eV